FEBRUARY, MDCCCLV.

THE ZOOLOGIST:

A

POPULAR MONTHLY MAGAZINE

OF

NATURAL HISTORY

AND

JOURNAL FOR RECORDING FACTS & ANECDOTES

RELATING TO

QUADRUPEDS, BIRDS, REPTILES, FISHES, ANNELIDES,
INSECTS, WORMS, ZOOPHYTES, &c.

THEIR HABITS, FOOD, RETREATS, OCCASIONAL APPEARANCE,
MIGRATIONS, NESTS AND YOUNG.

No. CXLVIII.

LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.

Price ONE SHILLING.

E. NEWMAN, 9, DEVONSHIRE STREET

HANDSOME NEW YEAR'S PRESENT.

A
HISTORY
OF
BRITISH FERNS.

BY

EDWARD NEWMAN, F.L.S., F.Z.S.

In cloth boards, 8vo., price 18s.

THIS work is illustrated by *one hundred and fifty-eight engravings*, which are carefully executed by some of our first artists, from the author's own drawings on the wood, and consists of studiously accurate figures of every species and variety of Fern found in Great Britain.

Opinions of the Press.

"It is a great gratification to have it in our power most cordially to recommend this work to all those who desire to obtain a knowledge of our British Ferns, as one which in accuracy of observation, elaborateness and clearness of description, and beauty of illustration, does not possess its equal."—*Annals of Natural History.*

"It is just such books as this which render Natural History so attractive to everybody who finds other pleasures in a country life besides hunting, coursing, fishing and shooting." — *Gardener's Chronicle.*

"To every lover of British Botany we cordially recommend Mr. Newman's volume."—*Magazine of Natural History.*

"The clear account of species, and the popular suggestions for their culture, contained in this volume, justify our cordial recommendation of its pages."—*Atlas.*

"The embellishments of this pretty volume are executed with equal good taste and skill."—*Gentleman's Magazine.*

"A valuable present to the lady botanist."—*Loudon's Gardener's Magazine.*

"No lady in the country ought to be without it."—*Gardener's Gazette.*

"Those who are desirous of acquiring an intimate acquaintance with our native species of this beautiful and interesting order of plants, cannot do better than consult Mr. Newman's 'History of British Ferns.'" —*Mr. Ward, on the Growth of Plants in Closely Glazed Cases.*

☞ **Ask for the Third Edition, dated 1854.**

JOHN VAN VOORST, PATERNOSTER ROW.

On Artificial Sea Water. By ROBERT WARINGTON, Esq.

IN the 'Zoologist' for August last (Zool. 4400) appeared a short communication from Mr. Gosse, on the artificial formation of sea water, and having lately had my attention especially directed to this paper by a friend who wished to put the formula given into practice, I was surprised at the difference in the proportions of the ingredients as compared with what I had myself employed in the course of 1853, more particularly from the circumstance, that when Mr. Gosse called upon me in January last, and consulted me on the feasibility of the plan, I told him that there could be no difficulty in the matter, as I had made and had then in use several small quantities artificially produced, and that all that was required was that a good analysis should be taken as the basis for deducing the proportions, and at the same time referred him to the source from which I myself had worked, namely, Dr. E. Schweitzer's analysis of the water of the English Channel, taken off Brighton.

Now, as numerous parties have been inquiring respecting this subject, and the erroneous formula has been copied into other journals, it may prevent much annoyance as well as disappointment if this matter is set right. The error appears to be twofold, the one arising from miscalculation, the other from assuming that the sulphate of magnesia, as given in the analysis, represented the ordinary crystallized salt, and not the anhydrous sulphate, which is always the case in giving analytical results, and which is, indeed, so specified by Dr. Schweitzer in his paper, when he states that the dry residue obtained by the evaporation of 1000 grains of water amounts to 35·25628 grains, consisting of the following ingredients:—

Chloride of sodium	27·05948	grains.
" of magnesium	3·66658	"
" of potassium	0·76552	"
Bromide of magnesium	0·02929	"
Sulphate of magnesia	2·29578	"
Carbonate of lime	0·03301	"
Sulphate of lime	1·40662	"

Now, as these results all stand in the same denomination, grains, it is competent for us to treat them as pounds, ounces, or any other weight that may best suit our purpose, and as the decimal notation is so readily capable of facilitating these deductions, there is no difficulty in at once arriving at the correct relations. Thus, the gallon of water being equal to 10 pounds, if we wish to estimate the proportions of materials for that quantity, or for 100 pounds, 10 gallons, it only requires that the decimal point should be removed, in the first case, two figures, or, in the latter, one figure to the left, and we have the whole operation completed and the result exhibited in decimal fractions of the pound; thus for 100 lbs. or 10 gallons:—

Chloride of sodium	2·706	
„ of magnesium . . .	0·367	
„ of potassium . . .	0·076	
Bromide of magnesium . .	0·003	anhydrous = 0·472 crystals.
Sulphate of magnesia . . .	0·230	
„ of lime	0·140	anhydrous = 0·178 crystallized sulphate.
Carbonate of lime	0·003	

It will be observed, that, in order to simplify the notation, I have decreased the extended places of decimals and employed the nearest amount to such fraction, by this means throwing off three places of figures. Then, by reducing these decimal fractions to the nearest value in terms of avoirdupois pounds and ounces, the proportions will stand thus for the 100 pounds of water produced:—

		Gosse.
Chloride of sodium	43¼ ounces.	35 ounces.
„ of magnesium	6 „	4½ „
„ of potassium	1¼ „	0$\frac{9}{10}$ „
Bromide of magnesium	21 grains.	——
Sulphate of magnesia anhydrous 3¾ oz. = crystals	7½ ounces.	2½ „
Sulphate of lime anhydrous 2¼ oz. = crystallized .	2¾ „	——
Carbonate of lime	21 grains.	——

In order to exhibit the extent of the error I have alluded to, I have placed in the adjoining column the proportions deduced by Mr. Gosse from the same analysis and for the same quantity of water, one of the ingredients having been omitted, besides the two that exist in so small a quantity. Now, as Dr. Schweitzer's analysis is on a given weight of which the saline ingredients constitute a part, it becomes necessary to deduct their weight from the 10 gallons of water employed: this, it will be seen, amounts to 60¾ ounces, or in round numbers to 60 ounces, which is equal to three imperial pints, so that 9 gallons and 5 pints will be the true proportion of water to be used.

The next point that presents itself is as to the best mode of obtaining these saline ingredients for the manufacture of the artificial sea water, as many of them, not being usually kept for sale, would have to be made for the purpose. There cannot be a question that by far the simplest plan would consist in the evaporation of the sea water itself in large quantities at the source, preserving the resulting salt in closely stopped vessels to prevent the absorption of moisture, and vending it in this form to the consumer; the proportion of this dry saline matter being 56½ oz. to the 10 gallons of water, less the 3 pints. This plan was suggested by Dr. E. Schweitzer himself for the extemporaneous formation of sea water for medicinal baths, and, on inquiry since writing the above, I find that such a preparation is manufactured by Messrs. Brew and Schweitzer, of No. 71, East Street, Brighton, under the title of "Marine Salts for the instantaneous production of sea water." Mr. H. Schweitzer writes me, that he has for many years made this compound in accordance with his cousin's analysis. The proportion ordered to be used is 6 oz. to the gallon of water, and stirred well until dissolved.

ROBERT WARINGTON.

Apothecaries' Hall, November 1, 1854.

Some Remarks on the Marine Fauna of the South of Devon.

By WILLIAM F. TEMPLER, Esq.

(Continued from page 4468.)

ZOOPHYTA—*Anthozoa Hydroida.*

Hydractinia echinata. On Buccinum undatum, Budleigh-Salterton; ova present in March.

Coryne pusilla. Rock pools, Littleham Cove and Ladram Bay. This zoophyte is much infested with parasites, amongst which I have noticed the beautiful Lichanophora or fan-bearer.

Tubularia indivisa. Dredged off Otter Point by C. J. Harris, Esq.

Sertularia polyzonias. Rocks between tide-marks, Dawlish, Shaldon, Teignmouth, attached to the rocks; very common from the Plymouth trawls.

„ rugosa. Parasitical on Flustra foliacea; Slapton Sands.

„ rosacea. Very fine, parasitical on Plumularia cristata, on the Slapton Sands; not uncommon from the Plymouth trawlers on Plumularia falcata and Sertularia polyzonias.

Sertularia pumila. Abundant everywhere, but very fine amongst the rocks on the Shaldon side of Teignmouth.

„ tamarisca. Plymouth trawlers.

„ abietina. Dawlish, abundant on Slapton Sands; Coppinia arcta may be found growing from it in small yellow tufts.

„ argentea. Very fine on the Warren, Exmouth, attached to mussels; it should be well examined with a lens, for the very small and pretty Campanularia syringa which grows from it.

Thuiaria articulata. I have found it on the Slapton Sands and the Warren, Exmouth, but it is very rare on the Devonshire Coast.

Antennularia antenina. Fine in Torbay, and also fine and very plentiful from the Plymouth trawlers.

„ ramosa. May be obtained from the Plymouth trawls; it is much more common than the foregoing species, and forms the largest portion of the refuse of the trawls.

Plumularia falcata. Plymouth trawlers; on the beach, Dawlish, at times in large quantities.

„ cristata. Rocks to westward of Dawlish between tide-marks; growing on the backs of Corwich crabs, and roots of Laminaria to be found on the Slapton Sands.

„ pennatula. Plymouth trawlers; I found a fine specimen thrown up by Otter Mouth, Budleigh-Salterton, after a heavy gale.

„ setacea. Rock pools, Exmouth.

„ myriophyllum. From the Plymouth trawlers.

Laomedea geniculata. Parasitical on Laminaria digitata, cast on shore on the beach, Budleigh-Salterton.

„ gelatinosa. Parasitical on Fucus serratus beneath the Hoe, Plymouth, abundant; also rock pools to the east of Exmouth.

Campanularia volubilis. From the Plymouth trawlers and Plymouth Sound, by dredge.

„ syringa. Exmouth and Dawlish, growing on Antennularia antenina.

„ verticillata. Slapton Sands, very fine; Plymouth trawlers; vesicles in the month of May.

„ dumosa. Plymouth trawlers, abundant, and also at times on the beach, Dawlish.

Anthozoa Asteroida.

Gorgonia verrucosa. Budleigh-Salterton, many and fine specimens may sometimes be procured here, cast on shore after heavy gales.

Anthozoa Helianthoida.

Caryophyllia Smithii. Attached to rock near low-water mark, near Hope's Nose, near Torquay; I mention this on the authority of Mr. Ralfs.

Actinia coriacea. Abundant amongst the rocks at Shaldon, near Teignmouth, Littleham Cove, Budleigh-Salterton.

;, bellis. Beneath the Hoe, Plymouth; also rock pools, Ilfracombe.

Lucernaria auricula. Abundant on Zostera marina, Mill Bay, Salcombe Estuary. It is also to be found in Littleham Cove, but rare.

POLYZOA—*Polyzoa Infundibulata.*

Tubulipora patina. Parasitical on Alcyonidium gelatinosum, Slapton Sands.

Crisia eburnea. Parasitical on other zoophytes, from the Plymouth trawlers; also from the trawlers, Ilfracombe.

Eucratea chelata. Fine specimens, parasitical on Halidrys siliquosa, beneath the Hoe, Plymouth, after a southerly wind.

Anguinaria spatulata. Beach, Budleigh-Salterton; parasitical on Algæ.

Hippothoë divaricata. On old shells, Budleigh-Salterton.

Lepralia tenuis. On valve of Pecten maximus, Dawlish.

„ unsata. Ilfracombe, between tide-marks, Hole and Smallmouth.

„ pediostoma. Hole, Ilfracombe.

„ semilunaris. On beach, Budleigh-Salterton, and beach, Exmouth, on dead shells.

Cellularia reptans. On Flustra foliacea, trawlers, Ilfracombe.

Flustra foliacea. The Warren, Exmouth; more abundant on the Slapton Sands; trawlers, Ilfracombe.

„ chartacea. Trawlers, Ilfracombe.

„ avicularis. On Flustra foliacea, trawlers, Ilfracombe; on Eschara foliacea, Budleigh-Salterton.

Salicornaria fasciminioides. Fine on Slapton Sands, and brought in abundantly by the trawlers at Plymouth and Ilfracombe.

Alcyonidium gelatinosum. On the Warren, Exmouth; the beach, Dawlish; very abundant on the Slapton Sands; on the beach, Wildersmouth, Ilfracombe, and from the trawlers, Ilfracombe.

Serialaria lendigera. At times abundant beneath the Hoe, Plymouth; parasitical on Halidrys siliquosa.

Bowerbankia imbricata. On the beach to westward of Dawlish. It is most abundant growing on Fucus serratus in the Salcombe Estuary, two or three miles towards Kingsbridge.

PS. In the former paper, I made some remarks on the Plymouth trawlers, as to their overcharge for the refuse of the trawls, and I spoke of it as worthless rubbish; perhaps I was not justified in this remark: the larger portion of the refuse of the trawls consists of fine specimens of Antennularia ramosa; amongst it may also be found the crustaceous Atelecyclus heterodon, and, in the Echinodermata, beautiful specimens of scarlet Goniasters.

WILLIAM F. TEMPLER.

Oban, Argyleshire,
December, 1854.

On the Corporeal Sensations of Insects. By OCTAVIUS PICKARD-CAMBRIDGE, Esq.

THE accusation of deliberate cruelty that has, by many humane and well-meaning persons, been cast upon the prosecution of the science of Entomology generally, and upon collectors of insects (who are not necessarily "entomologists," in the true meaning of the term) especially, has by different friends been so urged against me, an almost enthusiastic lover of the study and collection of this order of creation. Although, from the earliest period of my collecting, convinced of the comparative immunity of insects from what we call pain, and subsequently strengthened in that conviction by observations both in Entomology and other branches of Natural History—which is also probably the case with most entomologists who have at all directed their attention to the point—still I venture to put forth the following considerations on this subject, hoping that more experienced physiologists than myself will add to them the results of their researches, and that they may tend to remove from the minds of non-entomologists the idea of our being unnecessary and merciless inflictors of pain upon creatures, by their defenceless state entitled to our protection and support.

I will here first premise what I think all will agree in, that, even supposing pain to be inflicted, there is no class of men who show more real regard for the well-being of insects than true entomologists. Just observe the different modes of treatment to which these creatures are subjected by those who are and those who are not entomologists! the former, from a study of their habits, economy and position, as instruments in the great scheme of creation, are so deeply impressed with their importance, that, save specimens for the purpose of study (and these it is their great object to deprive of life by the speediest possible method), they are most jealous of the wanton destruction of a single insect; and to see these creatures, in the full enjoyment of life and vigour, performing their allotted part in the system of nature is an entomologist's most delightful occupation, while one who has not made them the subject of study and observation may perhaps have some vague idea of their being for some good purpose, inasmuch as "in wisdom they were all created," though more commonly but little really impressed by such a consideration, looks upon insects, at least those with which he is more immediately brought in contact, as wholly noxious and troublesome, and the unfortunate wasp, spider, caterpillar or other creature, is crushed with no more heed to its use or feelings than if it were a blade of grass; and if taxed with thoughtless cruelty, he tells you, as I have been frequently told, that it does not matter, seeing they are certainly not responsible creatures.

I have not here made any mention of the destruction of really noxious insects; but when any species is proved to be a real pest there is no one more ready or more qualified to aid in its removal than an entomologist; and, indeed, it is to him, almost without exception, that mankind are indebted for the discovery of many minute and destructive insects, and the means of exterminating, or, at all events, keeping them within due bounds; and, on the other hand, it is not unfrequently his pleasant office to rescue some inoffensive creature from undeserved obloquy and consequent immolation, on account of some fanciful injury or ignorant prejudice: this has happened to myself several times; once in particular when, hearing that, in a neighbouring parish, a farmer had caught and secured the "cause of the potato disease," I made inquiries, and was able to save from destruction and unmerited reproach sundry larvæ of the death's-head (*Acherontia Atropos*). Again: not long since, on showing an old gamekeeper a large box of the larvæ of the emperor moth (*Saturnia Pavonia-minor*), his exclamation was, "Lor, sir, they be poisonous!

I do always put my foot on 'em, and zao I do kill 'undreds o' 'em on the heath;" but its habits and transformations having been shown and explained to him, he was much struck, and promised to cease his thoughtless warfare.

But, after all apology has been made for entomologists, it must be admitted that they have a double character, one as "collectors," the other as "true investigators:" numbers there are merely of the former, who collect either for the sake of possessing some rarity or for having a fine series of beautiful objects, or for the excitement and difficulty of their capture: numbers, again, combine all this with a true love and admiration of them as creatures and as a scientific study. Many, again, collect for all the above reasons, and the additional one of making a profit by their sale, while many do so for the purposes of profit alone; all these motives are justifiable, and those who collect for any of the above reasons, other than for study, if of an intelligent disposition, are, from the necessary observations they must make in their pursuit, in a fair way to become in time something more than mere collectors; and, in fact, I doubt whether all entomologists cannot trace their present love of the science to some of these motives.

I might here (and it would be, indeed, a pleasant task) trace the general tendencies of the study of insects on the minds and habits of its devotees, and the numberless moral lessons, unheeded by those who neglect the wise man's command, "Go to the ant, thou sluggard, consider her ways, and be wise," that this study forcibly impresses us "that the works of the Lord are great," and that the sanction immediately following "sought out of all them that have pleasure therein," is peculiarly applicable; but my object now is but to show cause against the stigma of cruelty attaching to the pursuit of Entomology, by considering whether insects feel what we call "pain," in anything like the degree appreciable by ourselves or other warm-blooded animals, under similar inflictions or laceration of their parts: and here the question arises, "What is pain?" which I define to be "Unpleasant sensations experienced by living organized creatures on violence being offered to their parts." Sensation, from all we can find out by observation, is the peculiar result of a living nervous organization; it is not of necessity connected with life, for in that case all the vegetable kingdom may lay claim to it, and if we exclude this portion of creation from its influence, where, between it and the animal kingdom, is the line to be drawn, on one side of which is sensation and the other side none? Thus, sensation may be defined as the "perception of the organs of sense," which are so constituted as to inform their possessor of the contact or proximity of external objects, and the perceptions so excited may be either pleasurable or the contrary—*i.e.* may produce either pleasure or pain.

As to the degree in which these sensations are felt by animals other than man we can have no direct evidence, and can therefore only reason on them by analogy: thus, we find that certain inflictions produce certain effects on man; the like inflictions produce pretty similar results on all animals possessing a warm-blooded nervous organization similar to man, and as we are assured by man that such inflictions on him are accompanied by certain peculiar unpleasant sensations, *i.e.* by pain, I think we may not unreasonably conclude that such sensations, differently modified in some cases by other principles intervening, are also the results of the like inflictions on those similarly constituted animals. I am aware that this is but a presumption in favour of all warm-blooded animals possessing the same corporeal feelings; but it is still a fair presumption, although we know that many similar injuries do occasionally produce very different degrees of pain, even on different individuals of our own species, and, therefore, as we cannot infallibly deduce any particular amount of pain from any particular injury on one species of a large class, still less can we do so in reference to all the species of that class: however, the general truth of the proposition will, I think, be granted.

Passing on, then, to animals of a very different organization, still nervous but with a circulation of cold fluids, such as reptiles and fishes, we find that similar inflictions produce on them by no means the same results as on warm-blooded animals: a tortoise has been known to live four months after deprived of its brain, and without showing any symptom of suffering (see Dalzell's Introduction to translation of Spallanzemi, p. 45). Neither are insects or worms, likewise of a cold circulation, affected by injuries in anything like the degree that warm-blooded animals are: thus, once when out walking I had captured one of the largest species of dragon-fly, and after nipping the thorax pretty sharply, and apparently killing it, I pinned it to my walking-stick with a pin, the size of which, compared with the present entomological pins, was quite a lark-spit; however, after carrying it in this way for about half an hour, it began to flutter as violently as if totally uninjured, and disengaging itself from the stick, flew straight away, pin and all, at a considerable height in the air, until I lost sight of it in the distance. More recently I had taken a beetle, Lacanus parallellopipedus, and after immersing it for a few moments in scalding water, it being apparently quite dead, I pinned it to a piece of cork, and placed it in an open drawer to dry; two days after, missing it from the cork, I searched high and low, but could not find it, until at last it was found crawling away, with the pin still in it, at a distance of several yards from the drawer. Could we, or any other warm-blooded animal, have performed this, after a similar infliction? Again, it is well known that some species of moths may be pinned to a tree while at rest during the day, and appear to know nothing of the matter, for aught we can tell from any movement they make, until their usual period of flight arrives, when vain efforts are made to regain their liberty, and the only apparent inconvenience is the being *fixed* to the spot (see Introduction to Westwood and Humphries' 'British Butterflies,' &c.). I have myself witnessed similar instances, though at this moment I forget the species.* I have also seen a hornet (*Vespa crabo*) severed at the junction of the thorax and abdomen during a voracious repast on a pear, but this injury did not for some minutes appear to interrupt its enjoyment of the meal, and even when aware of its loss the only effect seemed to be the prevention of flight by the absence of the natural balance of its body. Is it, then, agreeable to our knowledge and ideas of the effect of pain to suppose that if, in any of these instances, there had been felt what would certainly have been our sensations under such injuries, they would have taken it so quietly and unconcernedly, and with scarcely more apparent feeling than would have been visible in a vegetable? and would not the physical effect of such maltreatment on ourselves have been to produce speedy, if not instantaneous, death? and if, therefore, we find injuries and violence to their parts producing on insects and warm-blooded animals such very dissimilar results, shall we not be justified in concluding that their feelings on these occasions are also of a very dissimilar nature?—that is, if a total dissimilarity of organization produces, as far as direct evidence goes, totally different effects, may we not reasonably conclude that the difference is kept up even as to those effects of the precise amount of which we have no direct evidence? there appears to me, at all events, a strong presumption in favour of such a conclusion.

Again, there are some parts of our own bodies that are sensitive in very different degrees from other parts; and some, again, such as those easily reproduced, the hair, nails and teeth (to a certain age), in which there is no feeling whatever, neither is there in the bones, and this shows that pain and the living material of nervous organizations are not necessarily connected; nor does the fact of pain in these parts, in a disordered or diseased constitution, affect this conclusion. Now, some insects, as the daddy-longlegs (*Tipula pectiniformis*), probably most species of spiders and some moths—I have witnessed this power in the angleshades (*Phlogophora meticulosa*)—part with their legs voluntarily on provocation or excitement, accompanied with but very little force: crabs, lobsters, and probably other species of that order, have the same power, and so independent appear to be these parts that their possessors, or rather losers, not only seem not the least concerned at the loss, but, as is the case with our hair and nails, these portions of their bodies are—in the case of crabs and lobsters, to my own knowledge—reproduced in due time: the slow-worm (*Anguis fragilis*) also, and lizard (*Lacerta agilis*), by muscular exertion, can throw off portions of their tails, which I have every reason to believe are reproduced.* There is, then, an analogy, in this respect, between such parts of the lower animals and the independent parts of man, and it seems reasonable thence to infer that the respective sensations in these corresponding parts are similar. There appears to be a sort of graduated scale in the comparative value of these independent parts in the different orders of animals, though, in all, they are the parts least essential to actual existence: thus, in the highest orders, the hair and nails; in the next, or cold-blooded, as reptiles, portions of the tail; in Crustacea, Arachnida and insects, more important parts, as legs and wings; lower again, as in worms, any portion may be cut off, and the head will be in full existence; and, lowest in animal order (the Polypi), are still less sensible to maltreatment; whence we pass, by insensible degrees, to the vegetable kingdom, in which scarce any amount of deprivation of parts, at the right seasons, appears to affect the vital energy. But as the above analogy, if granted, would only point to a probable immunity from pain in the limbs, &c., and their peculiar sets of nerves, and not in the body, where the principal nerves and matter are collected, I will notice another thing, which would apply equally to the whole of the insect; man and other warm-blooded animals may be viewed, in a general way, as composed of a mass of organized matter interspersed with nerves, all of which centre in one place—the brain—this mass of matter enclosing and supported upon a framework of bones, while insects, Crustaceans and Arachnida may be defined as a collection of nerves not centreing in one point, but with different centres, which, conjointly with other organs and a small amount of organized matter and juices analogous to the flesh and blood of warm-blooded animals, are enclosed in a case more or less solid, in some a mere cuticle, but in others horny, as in beetles, or as crabs and Mollusca, whose shells are as hard or harder than any bone: in other words, the one have the bones *inside* and the other the bones *outside*. Now, man's chief seat of feeling is in the softer parts, and those principally outside, that is, on the external surface of the body; he has little or no feeling in the substance of the brain or medullary matter, as the marrow, which flows from the brain, nor has he in the substance of his bones or hard outer cuticle, or in the mass of his flesh or in his blood. Why, then, should it be supposed that those animals which consist chiefly of these parts, namely, nervous matter, organized matter analogous to flesh, juices to blood, and hard cuticle to bone, and have none of that peculiar organization which we see in ourselves necessarily concomitant with acute feeling—why should it be supposed that they feel more pain than is experienced in analogous parts of warm-blooded animals?

---

* I have just had a striking instance of this with a number of small specimens of P. Populi.—O. P.-C.; December 10, 1854.

---

* In Mr. Gosse's work on Jamaica he has found this *is* the case with a species of lizard he met with there.

Again, it is certain that the lower the temperature of our bodies the less sensibility is there in them; and, it being certain that the temperature of the animals under consideration is by nature greatly below that of ourselves, it appears to me fair to conclude from it that their comparative sensibility is, in consequence, much less than ours: also, from the fact, that what used to be the most painful operations in surgery can now, by Mesmerism or magnetism and other means, be rendered entirely painless, we see not only that life, simply, and sensation are not necessarily connected, but that neither are a nervously organized life and sensation; and proves, moreover, that, under certain conditions of existence, animals can be actually without corporeal feeling. Whence I do not think it will be considered presumptuous to throw out, as a speculation, the idea that insects may be devoid of acute corporeal feeling, from the operation of magnetism, or some other such agent, acting on them under purely natural laws.

It is, *à priori*, an argument in favour of a very different degree of corporeal feeling among the different orders of animals, that others of the external senses are very variously experienced; smell and taste, for instance, and even the sense of hearing. Who doubts that the sensations of an animal who greedily devours putrid meat or drinks from a stagnant pond are, in respect of the sense of taste, widely different from those of one who revolts at the mere idea of such a repast? And so of hearing; who will say that the senses of hearing of an animal on which no sounds seem to make any, far less a pleasant impression, and of one who is ravished or painfully annoyed by certain sounds, are the same? It may be said that insects have no organs of hearing and tasting, whereby they could appreciate things in the way other animals do, and therefore it *proves* nothing; but, allowing this, in either case it shows how widely dissimilar in every material particular, in these respects, different creatures are, for if *one* sense is wholly wanting, why may not another be? and if the same cause produces pleasure on the one hand and disgust on the other, can their respective sensations be the same?

Let us look at the matter in another point of view: it is certain that impaling alive for a length of time and then being released, and many other severe injuries, loss of legs, wings, &c., have no permanent bad effects on insects, neither ultimately destroying nor suspending the main objects of their existence (multiplication of the species being among the chief), and, as I have noticed above, even the loss of the whole abdomen was not at first perceived, and would not for some time have been fatal, and, if this is so, is not the *sole*, or, at all events, the *principal* reason, as far as we can trace cause and effect, for their being endowed with acute corporeal feelings absent? Such injuries would be, many of them, instantly fatal to warm-blooded animals, and, at any rate, most of them would materially interfere in the carrying out the lot appointed them in the scheme of nature. So here we find as, in tracing out the workings of a benevolent Creator, we should expect to find that such animals are endowed with senses of such a delicacy and acuteness as may warn them at once, on the slightest injury, to avoid the threatening calamity. I conceive, therefore, that it would be to the last degree irreconcileable with what we *know* of the universal benevolence of God in the creation, to suppose that, without apparently any sufficient reason, myriads on myriads of His creatures, placed in situations peculiarly liable to injury and exposed to violence beyond all others, witness the thousands trodden under foot at every step we take, or destroyed in operations of gardening and husbandry, not to mention the countless swarms, the main end of whose creation appears to be to suffer a violent death, in being devoured as the appointed food of other animals—would it, I say, be reasonable to suppose that these orders are endowed with acute corporeal feelings?

With many persons, I am aware, it is sufficient proof of an acute feeling of pain in insects, that when impaled they often struggle violently and writhe themselves about, but I believe it is well known (I have experienced it myself over and over again) that moths and beetles, and other insects, may be impaled when at rest and show no knowledge of it, but take hold of the pin and remove the insect from its position, and it will struggle and writhe immediately; replace it, so that its feet may again have a firm hold, and it is perfectly quiet; and this is sufficient to show that no argument can be drawn from the fact of struggling and writhing, since these are evidently excited by some other cause, and are not therefore necessarily connected with pain. Again, it is well known to collectors that when insects still alive are pinned in the collecting-box, a cool situation will keep them perfectly quiet for any length of time, but bring them into a warm atmosphere, and all their wings are set fluttering immediately, though some, and I may particularly mention Eulepia cribrum as an instance, will not move, either in a cool or warm position, until their time of flight arrives. No one will, I think, argue from this that the temperature affects their *feelings;* the simple explanation of the circumstance appears to me to be that their muscular activity alone is instantaneously awakened or lulled by changes of time and temperature, in this their impaled state, as we know it is in their state of liberty. If a warm atmosphere were *essential* to the activity of insects, it would afford ground for supposing that other properties and senses, as feeling, &c., might also be awakened by it; but it is *not* essential, for some species C. Brumaria, for instance, may be seen in a state of the greatest activity during the coldest nights of winter. Nor am I aware that any degree of cold or heat raises or lowers the temperature of the insects themselves, though this is a fact which requires experiment to put it beyond doubt. Bees, indeed, it is well known, generate a considerable degree of warmth, even in the depth of winter, but this also is a fact now, I believe, unaccounted for.

I have thus set down in a cursory way, and without attempt at any methodical arrangement, the considerations which appear to me to lead to the irresistible conclusion that insects, and many others of the lower orders of the Creation, but insects especially, are by no means susceptible of the acute corporeal sensations that man and other warm-blooded animals undergo. In recapitulation, therefore, of these considerations in a more regular order, it appears that—

First, from a comparison of the effects, both physical and as shown by outward demonstrations of inflictions and injuries on warm-blooded animals, taking man as their type, and cold-blooded animals, insects in particular, as serving our present purpose, it seems impossible to conclude that their respective corporeal sensations are *in any degree similar*, but, on the contrary, the comparison points to the *most extreme amount of dissimilarity*.

Secondly, from a state of coma, induced by magnetism, being favourable to insensibility of pain in ourselves, it is evidently *not absurd* to suppose insects devoid of feeling, since they may possibly be by nature under some such influence.

Nor, thirdly, is it absurd to suppose them *devoid* of, or at any rate with *but a very low state* of the sense of feeling, since many like senses are in other creatures of such different intensity, and probably some senses occasionally absent altogether, or recompensed by others totally different!

Fourthly, from a comparison of the ultimate effects of injuries on the different orders of creation, the chief reason for being endowed with acute feelings appears, from considerations also of divine benevolence, to be absent, and therefore it does not seem *unreasonable* to conclude the absence of such feeling!

Fifthly, from the fact of a high temperature of body being connected with sensibility in ourselves, its absence would appear *to show a want of sensibility* in insects!

Sixthly, from a physiological comparison of their composition and internal and external organization with that of other creatures, it is *highly probable* that insects have *little or no feeling* whatever.

Seventhly, from a consideration of the circumstances connected with the struggling and writhing of insects impaled alive, it would *not be reasonable to connect it with* an acute sense of feeling.

I have given no authorities for any physiological positions I may have advanced, for what I have now written has been in the absence of works on the subject to which I could refer, and is therefore chiefly from recollection of former reading and personal observations, so that should there be any erroneous or dogmatic assertions I shall be too happy to have them pointed out and corrected; and, in fact, my principal reason for broaching the subject at all is to invite discussion, and to endeavour to draw forth the opinions of good scientific anatomists and physiologists.

I fancy now that I hear some one say that it will prove anything but a boon to the insect world to show them to be destitute of acute feeling—that the thoughtless will have no reason to be more thoughtful, and the humane, having none of the pangs of apprehended *cruelty*, will lose their chief inducement to treat them well; but I myself have no fear of any such result: that the thoughtless may be thoughtless still is very probable, but the humane, being spared the pangs of inflicting pain will be not only able, but hundreds will be induced who before would not hear of such a thing, to study these creatures closely, without fear of being disgusted, and it is from their being made a general object of study and investigation that I anticipate for them a thoughtful and lenient treatment, and I think I may even assert that the thoughtless in these matters are now but few and far between, and likely to become still fewer: on the other hand, if what I have said shows anything it shows that an enormous number of animated beings are still gifted with an acute sense of pain; so that there is no fear of deadening in the human mind, for want of exercise, the beautiful sentiments of mercy and pity, which will now be the more forcible as they will be less misdirected.

OCTAVIUS PICKARD-CAMBRIDGE.

Hatch Beauchamp, Taunton,
November 3, 1853.

PS. Seeing that the subject of *cruelty* to insects is mentioned in a paper on 'Killing Insects,' by G. B. Buckton, Esq. (Zool. 4503), who notices the disinclination of writers to broach the subject, I trust the present paper (written, as may be seen by the above date, last autumn) will be received as the first stray shot fired from the hitherto-silent fortress, to be followed up by the heavy batteries of other more skilful marksmen. One or two other facts mentioned by myself are also noticed by Mr. Buckton, but the different dates of our papers preclude any idea of intentional plagiarism; I think it also but fair to myself to state that I have never read it, nor was I before aware of Messrs. Kirby and Spence's treatise upon this subject, as mentioned by Mr. Buckton.

O. P.-C.

Bloxworth House, November 30, 1854.

[I could not have admitted Mr. Pickard-Cambridge's paper after peremptorily closing the brilliant but too extended discussion on the same subject, contained in the early volumes of the 'Zoologist,' had that gentleman reopened the question then at issue, but his observations appear too general to invite reply.—*E. Newman.*]

NOTICES OF NEW BOOKS.

'*The Zoology of the Voyage of H.M.S. Herald, under the command of Captain Heury Kellett, R.N., C.B., during the years* 1845—51.' Published under the authority of the Lords Commissioners of the Admiralty. *Reptiles and Fish.* By SIR JOHN RICHARDSON, Knt., C.B., M.D., F.R.S. Part III. Royal 4to, 32 pp. letter-press, 7 Plates. *Price* 10*s.* 6*d.*

WE have already expressed our inability to understand the plan of this beautiful and expensive work; we therefore address ourselves only to the contents of the portion before us, of which we give a synopsis, without pretending to have made any discovery as to the scope, design or arrangement.

Osteology (continued).—Mastodon? p. 141; Elephas primigenius, p. 142.

Reptiles.—Lophosaura Goodridgii, *Gray*, p. 143, Tab. XXVI.; Craniosaura Seemanni, *Gray*, p. 148, Tab. XXV.; Gecko Reevesii, *Gray*, p. 151, Tab. XXVII.

At p. 155 we learn that other species of reptiles and batrachians were collected on the voyage; a list of fourteen is given, among which occur "Rana, nova species from Canton;" "Gecko, near Naultina, from the Island of Gorgona, Coast of Peru;" "Rana, nova species from Mazatplan;" "Grammatophora and Emys scabra, from same locality, not marked. Likewise upwards of fifty species of snakes:—Crotalus, Dendrophis, Boa, Pelamis, &c., from various places, but chiefly from Western Mexico," p. 156.

Here are the indications of important and valuable additions to our Reptile Fauna, and we look forward with high anticipations to the publication of these novelties in that elaborately minute and wonderfully accurate style for which Sir John Richardson is so deservedly celebrated: we have no notice as to the date of publishing these details, but the author proceeds, on the same page on which the exciting announcement is made, to

Fish.—Anchisomus geometricus, p. 156, Tab. XXX.; Anchisomus angusticeps, p. 159; Anchisomus multistriatus, p. 160, Tab. XXIV.; Anchisomus reticularis, p. 161, Tab. XXXI.; Platessa stellata, p. 164, Tab. XXXII.; Platessa glacialis, p. 166, Tab. XXXII.; Salmo consuetus, p. 167, Tab. XXXIII.; Salmo dermatinus p. 169, Tab. XXXIII.

'*Transactions of the Linnean Society of London.*' Vol. XXI., Part III. 4to, 58 pp. letter-press; 5 plates. *Price* 12*s.*, *to Members gratis.*

This Part contains the following papers:—

'Notes on the Vegetation of Buenos Ayres and the Neighbouring Districts.' By Charles James Fox Bunbury, Esq., F.R.S., F.L.S., &c.

'On the Genus Aquilaria.' By the late William Roxburgh, M.D., F L.S., &c., with Remarks by the late Henry Thomas Colebrooke, Esq., F.R S., F.L.S., &c.

'On Acradenia, a New Genus of Diosmeæ.' Ry Richard Kippist, Esq., Libr. L.S.

'On the Genus Myrmica and other Indigenous Ants.' By John Curtis, Esq., F.L.S., &c.

'Note on the Elatus of Trichia.' By Arthur Henfrey, Esq., F.R.S., F.L.S., &c.

'Note on the Genus Ancistrocladus of Wallich.' By G. H. K. Thwaites, Esq., F.L.S., &c.

'Remarks relative to the Affinities and Analogies of Natural Objects, more particularly of Hypocephalus, a Genus of Coleoptera.' By John Curtis, Esq., F.L.S., &c.

'On the Osteological Relations observable among a few Species of the Bovine Family.' By Walter Adam, M.D.

'*The Annals and Magazine of Natural History.*' Nos. 83 and 84, dated November and December, 1854; *price* 2*s.* 6*d.* *each.* London: Taylor & Francis, Red Lion Court, Fleet Street.

No. 83 contains the following papers:—

'Contributions to the Natural History of the Infusoria.' By A. Schneider. [Extracted from Müller's Archiv. for 1854, p. 191.]

'Zoosperms of Spongilla.' By H. J. Carter, Esq.

'On the Genus Lycium.' By John Miers, Esq., F.R.S, F.L.S., &c.

'On the Occurrence of the Bottle-headed Whale (*Hyperoodon bidens*, Flem.), and Remarks thereon.' By William Thompson, Esq.

'On the Primitive Diversity and Number of Animals in Geological Times.' By L. Agassiz. [Extracted from 'Silliman's Journal' for May, 1854.]

'Memoranda of Observations made in small Aquaria, in which the Balance between the Animal and Vegetable Organisms was permanently maintained.' By Robert Warington, Esq.

'On a Mode of giving Permanent Flexibility to Brittle Specimens in Botany and Zoology.' By Professor J. W. Bailey, U.S. [Extracted from 'Silliman's Journal' for July, 1854.]

Bibliographical Notice:—A Manual of Natural History, for the Use of Travellers; by Arthur Adams and others.

Proceedings of Learned Societies:—Zoological.

Miscellaneous:—On the Natural and Artificial Fecundation of Ægilops by Triticum; by M. Godron [extracted from the 'Comptes Rendes,' July 17, 1854, p. 145]. The Ounces; by Dr. J. E. Gray. The African Seal (*Heliophoca atlantica*); by Dr. J. E. Gray.

The papers contained in No. 84 are as follow:—

'Remarks on Associations of Colour, and the Relations of Colour and Form in Plants.' By G. Dickie, M.D., Professor of Natural History, Queen's College, Belfast.

'On Linaria Sepium of Allman.' By C. C. Babington, M.A., F.R.S., &c. [From the 'Transactions of the Botanical Society of Edinburgh.']

'Characters of Four Indian Species of Cyclophorus, *Montfort*, followed by Notes on the Geographical Distribution of the Genera of the Cyclostomacea in Hindostan.' By W. H. Benson, Esq.

'Description of a New Bivalve Mollusca.' By H. and A. Adams.

'On Artificial Sea Water.' By Robert Warington, Esq.

'On the Genus Mermis.' By Dr. G. Meisner. Analysis by Dr. W. J. Burnett. [From 'Silliman's Journal' for July, 1854].

'On the Fecundation of the Coniferæ.' By Dr. W. Hoffmeister.

Proceedings of Societies:—Royal—Zoological—Botanical of Edinburgh—Linnean.

Miscellaneous:—Note on Alpheus affinis; by W. V. Guin, F.G.S. On a New Species of Rock Kangaroo; by Dr. J. E. Gray.

'*Transactions of the Entomological Society of London.*' New Series. Vol. III., Part 3. Demy 8vo., 48 pp. letter-press; 2 plates. *Price* 2*s*. 6*d*. London: Longman. 1855.

This part contains the following papers:—

'Descriptions of four New Species of Beetles belonging to the Family Paussidæ.' By J. O. Westwood, Esq., F.L.S., &c.

'On some of the Difficulties of Entomological Students, as exemplified by recent experience in the genus Elachista.' By H. T. Stainton, Esq.

'Description of a New Genus of Coleopterous Insects inhabiting the Interior of Ants' Nests in Brazil.' By J. O. Westwood, Esq., F.L.S., &c.

'Essay on the Genera and Species of British Formicidæ.' By Frederick Smith, Esq.

This is a valuable and interesting part, and one which will be particularly acceptable to the British Entomologist.

Birds in the Neighbourhood of Blackheath in 1854.—The following indigenous birds commenced their song in this order:—

Robin, *Erythaca rubecula*, Jan. 1.
Thrush, *Turdus musicus*, Feb. 5.
Chaffinch, *Fringilla cœlebs*, Feb. 6.
Wren, *Troglodytes Europæus*, Feb. 7.
Sky Lark, *Alauda arvensis*, Feb. 12.
Yellowhammer, *Emberiza flava*, Feb. 26.
Greenfinch, *Coccothraustes chloris*, Feb. 28.
Bunting, *Emberiza miliaria*, March 3.
Blackbird, *Turdus merula*, March 5.

Some of these birds were rather late in commencing their song, owing perhaps to the very severe weather at the beginning of the year. The redbreast sang bravely through all the winter frost and snow: of the rest, the chaffinch and wren commenced with a weak ditty something like the autumnal song, while the others were tolerably "strong in song" from the first.

Summer Birds of Passage, with the dates of their appearance.

Chiff-chaff, *Sylvia hippolais*, April 3. Love Lane, Lee.
Willow Warbler, *Sylvia trochilus*, April 10. Elmstead.
Tit Lark, *Anthus arboreus*, April 11. Plumstead.
Blackcap, *Curruca atricapilla*, April 11. Plumstead Common.
Redstart, *Phœnicura ruticilla*, April 13. Greenwich Park.
Whitethroat, *Curruca cinerea*, April 14. Annerley.
Wryneck, *Yunx torquilla*, April 15. Abbey Wood.

Sand Martin, *Hirundo riparia*, April 15. Beckenham.
Swallow, *Hirundo domestica*, April 15. Sydenham.
Nightingale, *Philomela luscinia*, April 16. Love Lane, Lee, and Abbey Wood.
Sedge Warbler, *Salicaria phragmitis*, April 16. Near Burnt-Ash Farm.
Martin, *Hirundo urbica*, April 17. Kidbroke.
Grasshopper Lark, *Salicaria locustella*, April 17. Shooter's Hill.
Cuckoo, *Cuculus canorus*, April 30. Dartford Heath.
Wood Warbler, *Sylvia sylvicola*, May 3. Greenwich Park.
Whinchat, *Saxicola rubetra*, May 4. Farm Lane, Lee.
Lesser Whitethroat, *Curruca sylviella*, May 5. In my own garden.
Spotted Flycatcher, *Muscicapa grisola*, May 6. Greenwich Park.
Swift, *Cypselus apus*, May 18. Wimbledon.

It appears to me that some at least of these birds commenced singing on the day of, or the day after, their arrival: such was especially the case with the willow warbler and the redstart. On the day I first heard them my attention was only arrested by two or three weak notes, which was all I heard, and that from only a single individual of each species; and yet there could be no mistake, for, singular to say, on the following morning every grove was resonant with their voices. I was particularly struck with these two cases, and only less so in the case of other birds. It seemed as though they arrived in song, but the fatigue of the journey rendered it necessary for them to rest a few hours before giving utterance to their buoyant feelings.

It is to be remarked, in reference to the foregoing list, that the weather in the first half of the month of April was bright and warm, but towards the 19th or 20th it changed to dull and cold, and every one must recollect the very severe night of the 23rd. This checked the influx of our summer visitors for a time, and, although up to that period fresh arrivals were taking place every day, a fortnight elapsed, during which Nature retrograded and the remaining birds wisely kept aloof.

I was unfortunately not in a position to note the cessation of the summer song with any accuracy; but I observed that the following birds recommenced their song later in the season:—

Blackbird, *Turdus merula*, Aug. 4.
Robin, *Erythaca rubecula*, Aug. 5.
Willow Wren, *Sylvia trochilus*, Aug. 23.
Blackcap, *Curruca atricapilla*, Aug. 30.
Chiff-chaff, *Sylvia hippolais*, Aug. 31.
Wren, *Troglodytes Europæus*, Aug. 31.
Starling, *Sturnus vulgaris*, Sept. 1.
Swallow, *Hirundo domestica*, Sept. 1.
Goldcrest, *Regulus auricapillus*, Sept. 12.
Chaffinch, *Fringilla cœlebs*, Oct. 15.
Lark, *Alauda arvensis*, Oct. 18.
Thrush, *Turdus musicus*, Oct. 19.
Hedgesparrow, *Accentor modularis*, October 19.

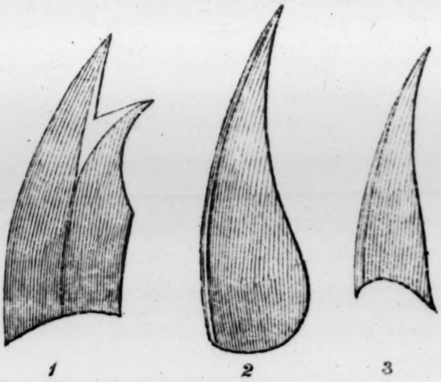
I am much inclined to believe that, at least in the majority of instances, the birds which first begin by favouring us with their long-lost voices in the autumn are the young birds of the year; in some cases I am sure of it, from having seen the young birds themselves utter the note to which my attention has been directed owing to its having been so long silent. I do not assert that they alone sing in the latter part of the season, but I believe they are generally the first to break the autumnal silence. The redbreast is by far the most indefatigable vocalist: throughout the whole year he was silent only from July 17th to August 5th, and then the quiet was profound: for weeks together his was the only voice heard, and nothing seems to impair his powers:

so incessant is his music that the small *recording* voices of his progeny are unheard. In conclusion, the swallow left us on the 5th of October; but nearly three weeks' afterwards, on the 22nd of the same month, I saw a single swallow flying briskly about at Auchincruive, four miles from Ayr, N. B., at 5 in the afternoon, the weather being cold, wet and inclement. — *Cuthbert Collingwood; Purley Park, Berks, December*, 1854.

Occurrence of the Snowy Owl (Strix nyctea) *in Sutherlandshire.*—About the 15th of October, 1853, the forester at Altneharrow, in Sutherlandshire, observed a very remarkable bird on Knock Stack, a high rock in the forest. He had his rifle with him, and killed what turned out to be a very fine adult specimen of the snowy owl, which is now in my collection. He says he has never seen or heard of any bird like it during the whole time he has lived at Altneharrow. It is the largest British specimen I have ever seen.—*W. M. E. Milner; Nunappleton, December* 30, 1854.

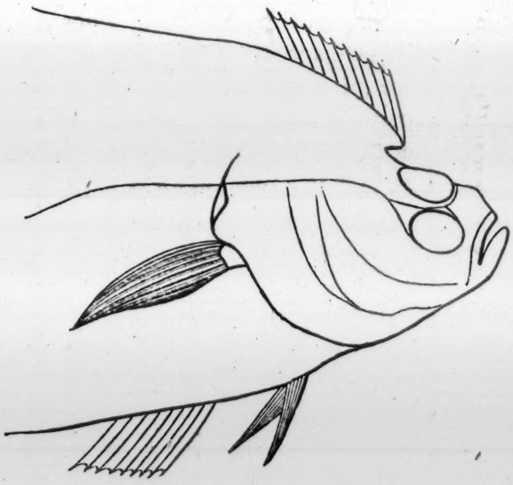
Singular Conduct in a Robin.—Some few weeks ago I was amusing myself with a common snake (*Coluber natrix*), and in order more perfectly to observe its beautiful and graceful motions I placed it on the lower branches of an apple tree. This arrangement had evidently been watched by a robin, for immediately the snake commenced climbing towards the top of the tree the robin perched himself about a yard distant from his head, and followed him closely wherever he went, occasionally venturing even within a few inches. The snake did not regard the presence of the bird, but appeared quite indifferent, while the inquisitiveness and daring of the latter were really very interesting. All this took place within a few feet of where I was standing, and, although the tree was shaken rather violently at times, the robin seemed so absorbed in the contemplation of his strange neighbour that he took no notice of my presence. May not similar occurrences have been observed in other countries, and thus have given rise to the absurd tales told of the power of fascination possessed by reptiles?—*G. Norman; Hull, December* 20, 1854.

Notice of a Tunny stranded in the Estuary of the Tees.—I beg to send the following account of a very large fish, which two fishermen of Stockton found on a sand-bank in the estuary of the river Tees, in September last, and which has proved to be a fine specimen of the Thynnus vulgaris of Cuvier:—In October, 1854, I was informed that two fishermen had found a remarkably large fish, which was to them quite unknown, on a sand-bank of the Tees, where it had very recently been stranded. The description of this strange fish, as given by these men, was as follows: it had a head much like that of a salmon; the large back-fin was spiny and erect, like that of a perch; the tail was curved and spreading. The colour on the back was nearly black, but that on the under part light. I at this time received a large bony scale, which had been taken from the front of the fish, as well as a portion of the thick and smooth skin of the back, containing numerous imbedded smaller scales. From this account it occurred to me that this unknown fish was most probably a tunny, which, in its pursuit of herrings and other small fishes, had run itself upon a sand-bank, where it was left by the receding tide. Again, in the latter part of December, 1854, I obtained the following further information, from the same source in Stockton, respecting this fish. The fishermen described the flesh on being cut as much resembling a piece of highly salted bacon, *i. e.* red with salt or saltpetre: they said its weight was "pretty well on to 60 stone," and that three strong men could, with difficulty, move it over from one side to the other. My informant had shown one of these men Mr. Yarrell's figure of the common tunny, in his 'British Fishes,' which he at once pronounced to be the identical, and to him unknown, species. He also showed me the tail, which directly confirmed my supposition of its being a tunny. This was of a very regular crescent-shape, with one-half or division exactly similar in curvature to the other: it had 18 rays in each half, = 36 in the entire caudal fin or apparatus; and between the two divisions and sides a cartilaginous keel was well defined. The width between the tips of the crescent, or from one tip of the tail to the other, I found to measure 2 ft. 8¼ in. Mr. Pennant, in his 'British Zoology,' (p. 362, vol. iii. edit. 1812) has described a large tunny, which had been captured in Inverary, when he was there, in 1769, the tail of which, he says, "was in form of a crescent, and measured 2 feet 7 inches between tip and tip." If, therefore, the wide spreading of the tail be any true or uniform character, from which an estimate of the size of the fish could be fairly taken, the Tees specimen would be evidently larger than that recorded by Pennant. I then requested my informant to inquire, when he next saw the fishermen, if they had observed any small appendages or finlets on the body, where it tapered towards the tail, as this seemed to me to be the only character wanting to decide what little doubt could remain in my mind as to the identity of the species. Next, on my third visit to him at Stockton, on January 5th, 1855, he, to my great satisfaction, exhibited to me two strips of the skin cut from the back and belly, with these finlets attached, which of course determined the species beyond all question. The number of spinous finlets or fin-like appendages on the skin from the back amounted to eight, whilst the number of those from underneath was nine; but I know not whether all of them had been carefully saved. Yet, from the descriptions of different naturalists, it is clear that these spurious finlets vary in number, for Linnæus and Fleming reckon them "utrinque octo;" Artede and Cuvier "octo seu novem;" Gronovius writes "utrinque novem;" and Jenyns "nine above and below." Also Pennant, in the Inverary specimen, makes them "eleven above and ten below." May these finlets increase in number, as the fish itself increases in size and age? Their colour was of a dirty yellow, edged with dark brown or black. Of the other fins that were at the same time shown to me I need make no mention, except indeed of the pectoral, which was remarkable from its extremity being cleft or divided, and which evidently (from the age and entireness of the strong black skin) had not been recently done, if accidentally done in its origin. The annexed diagram 1 represents its form, with the plain skin devoid of rays between the cleft, whilst 2 gives the form of the pectoral fin from Pennant, and 3 that as figured in Donovan's plate 5. The total length of this pectoral fin was 12½ inches, and the number of rays was 31 or 32, according as one, which appeared double or branched into two at a little distance from its base, be counted one or two: the



whole was covered with a black, smooth and leathery skin. Mr. Jenyns, in his specific characters of the common tunny, says (p. 362, 'Manual Brit. Vert. Animals'), the pectoral is "contained five times and a half in the entire length:" if this measure be correct, and not found to vary as the fish becomes aged, the entire length of the Tees fish would have been just about 5 feet 9 inches. I cannot, however, but think that this measure is liable to some variation, because Pennant's fish was 7 feet 10 inches long, or 2 feet 1 inch longer than the former, whilst the spread of the caudal crescent of the Tees fish was 1¼ inch wider than Pennant's These characters seem to me to require further investigation, which perhaps can only be effected in the Mediterranean, as in our own seas the tunny is so rare. The large scale, or rather osseous plate, which was taken from the corselet on the thorax of the Tees specimen, proved on measuring it to be an oval, a little more than 1¾ inch in length by 1½ inch in width; but the small scales that are imbedded under the external leathery skin of the back are rounder, and many averaged nearly ¾ths of an inch in diameter. The disposition of these smaller scales and the great strength of the coating itself are very remarkable; and as I could find no description of them in any work on Ichthyology, I gave a brief account of them in a short communication which I made to the Linnean Society, on the 5th of December, 1854, since which time I have had the satisfaction of thoroughly identifying the species. I may observe that the only time I have seen a freshly caught and perfect tunny was in the month of June, at Palermo, when two able-bodied fishermen were carrying it on their right shoulders, the one walking a few feet before the other; but I had not then an opportunity of visiting a Tonnara and witnessing the method of catching this large and most useful fish.—*John Hogg; Norton, Stockton-on-Tees, January* 10, 1855.

Supposed New Species of Flounder.—Having lately obtained in this neighbourhood several specimens of a Platessa (flounder) which differs in many respects from the common flesus, I send a slight sketch of it. Very dark brown (almost black) on both sides. The length of the head, as to the whole length of the fish, is as two to nine; the pectoral, ventral and caudal fins are considerably longer than in the same sized specimens of Platessa flesus; but the greatest peculiarity is the deep notch, in the dorsal line, immediately behind the eye. The fin-rays in number are—D. 58; P. 10; V. 6; A. 41; C. 18. In all other respects it is similar to the common flounder. The largest specimen is about 6 inches long. I should feel greatly obliged if any of the correspondents of the 'Zoologist' would supply me with duplicates of recent and fossil fishes' ear-bones.—*Edmund Thomas Higgins; Birkenhead, December* 26, 1854.



White Specimen of the Flounder (Platessa flesus).—In his invaluable work on British Fishes, Mr. Yarrell remarks, "Varieties of the flounder occur much more commonly than those of any other species of flat-fish. I have before me, while now writing, specimens without any colour on either side; specimens coloured on both sides; and specimens with both eyes and the whole of the colour on the left side instead of the right. Those without any dark colour on either side are albino varieties, through the transparent skins of which the colour of the blood-vessels and muscles has suggested the trivial names of rosea and carnaria to the authors who considered them species." Through the kindness of Mr. Jenner Weir I have before me a specimen of the flounder which seems to present some peculiarities: both sides are white, but the eyes themselves are of the usual colour, and without that peculiar red tinge which usually characterises albinos: there is no rosy or flesh-coloured tint on either side, and the blood-vessels and muscles are not discernible through the cuticle, so that this appears to be quite distinct from that peculiar freak of nature called albino.—*Edward Newman.*

Shell-fish burrowing into Rocks, &c.—Mr. Charlesworth * gave an account of the various theories which have been advanced by naturalists, to explain the remarkable power possessed by certain kinds of shell-fish, of burrowing into rocks, hard timber, and other substances. The hypothesis explanatory of this curious phenomenon, to which he first adverted, was that of Mr. Garner, an hypothesis which deserves especial consideration, from it being adopted by so high an authority as Professor Owen. Mr. Garner supposes that the currents of water produced by the movements of the vibratile cilia, or hair-like processes with which some portions of the bodies of shell-fish are covered, is the chief agent by which the burrows of these creatures are hollowed out. Mr. Charlesworth considers this theory untenable on two grounds: one, the extreme improbability that currents of so feeble a character as those produced by the cilia of shell-fish could sink holes in rocks of the hardest limestone, even if the excavation of these holes occupied a period of a thousand years, instead of being, as is well known, effected in a few days or weeks; the other, that of there being a limit to the depth of the burrows, for all stone-boring shell-fish leave off excavating when they have lodged themselves at such a distance from the surface of the stone as is consistent with their own security and the supply of their wants. Now the ciliary currents alluded to by Mr. Garner are in motion during the whole life-time of these creatures. If, then, these currents scoop out the holes in question, a burrowing shell-fish through life would never cease to deepen its excavation, a condition which is not found to be borne out by fact. A more generally received hypothesis, and one of much earlier origin than the above is, that shell-fish bore into stone by a rotation of their own shell, which is assumed to act as an auger or drill, and to be sufficiently hard to file away those portions of solid bodies against which the instinct of the contained animal directs it. The characters of the Pholas, a shell whose burrows may be seen at low tide on the scar at Whitby in the greatest profusion, favour this theory, since its shape is cylindrical, and its surface studded with numerous short strong spines, apparently well adapted for rasping. Mr. Charlesworth, however, could not accept the mechanical hypothesis in connexion with the *shell* as the perforating instrument, for though it may explain the burrows made by the Pholas, it is utterly inapplicable to the case of other stone-borers, some of which, though not cylindrical, occupy excavations of the same shape as their shell, and which excavations consequently could not be scooped out by a rotatory motion of this organ, no rotation being possible; while other kinds, although like the Pholas of a cylindrical shape, instead of having the shell rough and file-like, have it covered with a delicate membrane, of such a nature that any friction of the shell against a hard substance would inevitably effect its destruction; yet this membrane is found present and uninjured on shells of this particular kind at all periods of their growth. The next hypothesis reviewed was the chemical one — that which supposes stone-boring shell-fish to secrete an acid or a peculiar solvent capable of dissolving all the various substances into which these creatures burrow, not even excepting wax. Mr. Charlesworth enumerated as difficulties in the way of accepting the chemical hypothesis, that, after repeated and most carefully conducted experiments, chemists had failed in detecting the smallest trace of an acid secretion in the skin or other soft parts of stone-boring shell-fish; that if any such assumed acid or solvent do really exist, its properties must be of a most novel and extraordinary kind, from the variety in the chemical constitution of the substances upon which it acts,—wax, wood, limestone, &c. &c.; that it would, upon this hypothesis, be difficult to understand how it is that the solvent in question does not act upon the creature's own shell, as well as upon the walls of the burrow or cell in which that shell is lodged; and lastly, as the work is carried on under water, it would be necessary to assume some provision for the application of the solvent without the accident of its dilution by the surrounding fluid, a provision which would hardly appear possible in some cases, such, for instance, as the excavations made by Gastrochæna and Lithodomus, in the highly porous substance of the common brain coral. In conclusion, the attention of the meeting was directed to the views and elaborate researches of Mr. A. Hancock, of Newcastle, bearing upon the elucidation of this long-agitated problem in Natural History. Mr. Hancock states that, upon submitting to microscopic examination that portion of the boring shell-fish designated by comparative anatomists as the "foot," he found it studded with minute crystalline bodies, upon which acids had little or no effect: hence he assumes these bodies to be silicious, and, detecting their presence in other organs of the animal besides the foot, he founds upon this and other considerations most ably treated of in his published memoir upon the subject an hypothesis that the burrows of shell-fish are formed by a mechanical process, but that the soft parts of the animal armed with these silicious studs or points are the boring instrument, not the shell. In reference to this last hypothesis, Mr. Charlesworth stated that he thought it far more philosophical than any of the theories which Mr. Hancock's predecessors in this field of research had advanced. He still, however, saw difficulties in the way of at once adopting it. Other naturalists, however, would doubtless follow the line of investigation pointed out by Mr. Hancock, and independent observations would, ere long, be forthcoming in confirmation or refutation of this gentleman's views. A highly interesting series of specimens of stones, wood and coral, showing the boring shell-fish in their burrows, were exhibited by Mr. Charlesworth in illustration of his remarks.

---

* At the Meeting of a Natural-History Club at York.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

January 1, 1855.—EDWARD NEWMAN, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the donors: — The 'Zoologist' for January; by the Editor. The 'Athenæum' for December; by the Editor. The 'Literary Gazette' for December; by the Editor. The 'Journal of the Society of Arts' for December; by the Society. 'Entomologische Zeitung' for November and December; 'Linnæa Entomologica,' 9 Band; all by the Entomological Society of Stettin. Hewitson's 'Exotic Butterflies,' Parts 12 and 13; by W. Wilson Saunders, Esq. 'Transactions of the Linnean Society,' Vol. xxi. Part 3; 'Proceedings of the Linnean Society,' Nos. 52—58; 'List of the Linnean Society, 1854;' 'Address of T. Bell, Esq., President of the Linnean Society, at the Anniversary, May 24th, 1854;' all by the Linnean Society. 'Proceedings of the Literary and Philosophical Society of Liverpool,' 1853—4; by the Society. 'The Entomologist's Annual for 1855;' by the Editor, H. T. Stainton, Esq.

Exhibitions.

Mr. Douglas exhibited a living specimen of Cratonychus castanipes, *Payk.*, one of the Elateridæ, which he found a few days since in the centre of a large mass of rotten wood thoroughly permeated with fungoid matter, which he dug out of an old oak stump, and within which it lay in an oval cell, at one end of which were seen the pellicles of the larva and pupa. This species, kindly determined by Mr. Janson, has not hitherto been recorded as British, though it probably exists in most collections mixed with Melanotus fulvipes, which it greatly resembles.

Mr. Stevens exhibited a fine specimen of the male of Jumnos Ruckeri, from Darjeeling, and a fine female of Dicranocephala Wallichii, from India; both beetles out of the same collection.

Silk Felt produced by Saturnia Pavonia-media.

The President exhibited a specimen of silk produced at Vienna by the larvæ of Saturnia Pavonia-media called in Germany "Schwartzdornspinner:" he had received it through the kindness of Herr Pretsch, from whom he learned that a series of most interesting experiments were now in progress, the object being to obtain, from the labours of this insect, a silken felt impervious to water. The larvæ were confined separately in polished receptacles, from which there was no escape, and which presented no salient points that the cocoons could possibly be attached to, so that the whole stock of silk was exhausted on the smooth surface, and could afterwards be removed at pleasure. As the space allotted to each caterpillar was large and the stock of silk small, the coating was very thin, as in the specimen exhibited, but the felt was readily increased in substance by introducing a second and then a third larva, each of which readily worked on the felt manufactured by its predecessor. He did not know to what extent the experiments have hitherto been carried, but he believed they promised perfect success.

Note on Helobia impressa, Newman.

The President read the following memorandum on Helobia impressa:—

"I beg to exhibit some specimens of the insect which twenty-three years ago I ventured to describe as distinct, under the name of Helobia impressa; and I do this, not because I am now at all persuaded of its distinctness, but because the Rev. Mr. Dawson appears to have been unacquainted with the insect at the time he was preparing his invaluable 'Geodephaga Britannica.' Helobia impressa was found at a great altitude, on Ben Nevis and Ben Voirlich, by our friend Mr. Walker, and was distributed by him amongst entomologists at the time: the specimen which I beg to exhibit was captured by him. The difference between this and the common Welsh insect, Helobia nivalis, is this:—in nivalis, one interspace of each elytron, the *third* counting from the suture, is impressed with large deep foveæ; in impressa, two of these interspaces, the *third* and *fifth*, are thus impressed, giving the insect, at the first glance, a very different appearance. After having read Mr. Wollaston's admirable remarks on the effects of isolation on species, I will not presume to dwell on the importance of the character on which the species is founded, but I trust entomologists will agree with me that the subject is worthy of investigation, and that this very doubtful species ought at least to be separated from its Cambrian congeners as a named and locally isolated variety."

Improvements in Bee-hives.

Mr. Downie exhibited a model of a wooden bee-hive, containing, as he explained, several important improvements, proved by its use for the last three years. The improvements consisted of a moveable open floor with bars placed transversely to the bars of the hive, sliding above the true floor of the hive, and affording great facility for removing dead bees in winter without admitting cold air, a circumstance on which he laid much stress, as by the ordinary method of lifting the hive for the purpose of clearing the floor the bees were injured by the reduced temperature in the hive; and where the dead bees were not removed, as was too common, the effluvium arising therefrom was most prejudicial to the living bees: this winter, within a circuit of nine miles from his residence, he knew five hundred hives in which the bees had perished either from this cause or the want of ventilation. Another improvement was a set of openings below the false floor and at the top of the hive, which could be closed entirely or partly at pleasure, as occasion required, and by which the ventilation of the hive was at all times secured. The third improvement was a shallow zinc feeding-trough at the side of the moveable floor. The whole hive was surrounded by a loose wooden cover.

"*Notes on the Economy of Various Insects.*"

Under the above title the following notes, by John Curtis, Esq., were read:—

"As nothing can contribute so essentially to the advancement of the science of Entomology as a correct knowledge of the economy of insects, whether we regard their influence on the vegetable productions of the earth, or study them as a branch of Natural Science which has occupied the attention of some of the most celebrated philosophers of antiquity as well as those of our own age, I shall make no apology for laying this sketch of the habits and transformations of some species but little known, and to which I shall hope to make additions as opportunities may offer.

"In 1844 Col. Goureau contributed a memoir upon this subject to the Entomological Society of France,* full of truth and interest, and I trust the following observations may throw some light upon the early stages of various families of insects. I regret that several years have passed since many of the discoveries were communicated to me, and those facts which fell under my immediate observation were principally collected in the year 1848, in the Isle of Wight, in company with my esteemed and lamented friend Dr. Wm. Arnold Bromfield.

"*Anthemis Cotula.* Stinking Chamomile.

"On the 10th of August at least half the flower-heads around Ryde had the receptacles infested by little maggots, which ate into the solid parts, giving them a brown appearance when the florets were removed. They were cylindrical, shining and whitish, with two very minute sharp black hooks at the head. When arrived at maturity they contracted themselves, and assumed an oval form: they then changed inside the receptacle, or in cavities eaten on the surface, to oval pitchy pupæ, from which a fly (*Tephritis radiata*) emerged on the 12th of August. There were also scarlet larvæ of a Cecidomyia and various others, which evidently escaped my search from their minuteness, as from the flowers I bred the following insects:—from the 20th to the 28th August, Tephritis radiata, *Fab.*, 9 specimens; Cecidomyia, 2; Lasioptera, 3; Phytomyza lateralis, *Fall.*, 3.

"The Hon. C. Harris first detected the larvæ of the Phytomyza feeding in the receptacles of Pyrethrum inodorum.† The cocoons are elongate, cylindric, the ends rounded, with two minute tubercles at the head; they are coriaceous, but very thin, shining, and of a straw colour.

"On the 22nd of September, from the same heads, I found hatched in the box—Cochylis subroseana, *Haw.*, 1; Phalacrus æneus, *Payk.*, 1; nov. gen.? of Staphylinidæ allied to Hypocyptus; and Pteromalus, 2 species.

"*Senecio Jacobæa.* Ragwort.

"There were small and large maggots in some of the receptacles which were more or less eaten out, the cavities being blackened with the dung of the larvæ, whilst others contained pupæ.

"On the 28th of August males of Tephritis marginata, *Fall.*, hatched, and on the 30th two females came forth; also three of Cecidomyia flava, *Meig.*

"The larva of the Tephritis is elongated, fleshy and yellow, attenuated at the head, which is furnished with two minute black hooks, and two trifid ferruginous spiracles at the tail. The pupæ are oval, but curved, black and shining like polished ebony.

"*Inula dysenterica.* Common Fleabane.

"The 11th of August the receptacles had been eaten into by a caterpillar, and the space was covered with dung. This caterpillar could descend by a thread: it was

---

* 'Notes pour servir à l'Histoire des Insectes qui vivent dans le Chardon penché (*Carduus nutans*),' par M. le Colonel Goureau. 2nd Series, v. 3, p. 75, pl. 2.

† Vide Curtis's Brit. Ent. fol. and pl. 393.

somewhat depressed, broadest anteriorly, the segments constricted and slightly hairy, ochreous with bright brown spots on the back, caused by the intestines shining through: the head was small, black and shining, with two black spots on the thoracic segment; the six pectoral feet were very minute, as well as the anal ones: the excrement towards the tail shone through of a green colour, and there was a spot at the tip. These, I suspect, are the caterpillars of a Tinea (*Aphelosetia? Inulella*),* two of which I bred from the flowers of the Inula on the 28th of August, and in all probability the larvæ feed on the seeds.

"On the 9th of September I bred also a female of Microgaster lacteipennis, *Curt.*; and on the 10th Pteromalus cupreus, a male, and an ichneumon allied to Trachyderma or Bassus.

"*Carduus lanceolatus.* Spear-thistle.

"On the 11th of August I found maggots in the receptacles, feeding on the seeds. They were fat, barrel-shaped, but attenuated before, shining ochreous-white; head furnished with two short black hooks, the tail with a circular ferruginous space, the lower margin pitchy, with two minute spiracles in the centre of the stern. The pupæ, which were imbedded in the woolly receptacles, were similar in form to the larvæ, being attenuated to the head and obtuse at the tail, and of an ochreous or rusty colour. From these, on the 4th of October, I bred a female Tephritis pallens, *Wied.*, and afterwards four males and eight more females.

"*Juncus glomeratus.*

"Dr. Bromfield frequently found, attached to the bundles of seed-vessels, whitish cases in which the larvæ of some species of Coleophora had lived, and from which the moths had hatched about the third week in August, but most of them produced a minute dark green parasite of the family Chalcididæ, which prevented my ascertaining the name of the moth: possibly it is the Porrectaria leucapennis of Haworth, or the Coleophora cæspititiella of Zeller.

"*Artemisia maritima.* Sea Wormwood.

"At the end of September, 1852, I bred from this plant two specimens of a minute Cecidomyia? and a still smaller Entedon.

"*Pistacia Lentiscus.* Mastic.

"During my sojourn at Nice, in Piedmont, in 1850—51, I frequently found upon the Pistacia bushes, which grow wild on the rocky hills near Nice and Villafranché, galls attached to the midrib of the leaves, as large as scarlet bean seeds and somewhat of a similar shape: they were very plump, of a pale green colour, more or less rosy from being marbled with red. In the early part of December I opened and examined the contents of these galls, and found them to contain an Eriosoma, very like E. bursaria, *Linn.*, but larger, and also the pupæ of an Agromyza, rather larger than Phytomyza lateralis. It was of a cinereous tint, as if dusted with the white powder which enveloped the Eriosoma; the face white; antennæ black; legs ochreous; the thighs dark, tipped with ochre. I will name this provisionally Agromyza Pistaciæ. A Pteromalus also issued from the galls, no doubt a parasite of the fly.

---

* "Vide my description in the Ann. and Mag. Nat. Hist., 2nd Series, v. p. 117.

"I once saw, on a lawn at Wilton, the larva of some genus of this family carrying off an earthworm several times its own length; and last May a gentleman near London caught a similar larva holding fast to a worm by its strong mandibles.

"After heavy rains I have observed the Carabus glabratus, *Fab.*, on the mountains in Yorkshire, emerge from their hiding-places and seize earthworms in their jaws, running off with them readily enough.

"The following species have been observed or reared from the larvæ by F. J. Graham, Esq., F.L.S.:—

"Helobia brevicollis, *Fab.* In turnip-fields, where the larvæ form cells about two inches below the surface, communicating with the surface by a vertical shaft.

"Malachius bipustulatus, *Linn.* Bred from an ash stump. It has also been reared from the stalks of an Echium by M. Vallot; and M. æneus, *Linn.*, has been obtained by M. Perris from stubble, where it undergoes its transformations. The larvæ are carnivorous.

"Elater longicollis, *Fab.* Reared from a pupa found in his garden at Cranford. The exuvia of the larva exhibits a structure of the tail somewhat like that of E. murinus? viz., with a denticulated margin and two horny processes at the apex.

"Pezomachus agilis, *Fab.* Females of this ichneumon and Microgaster annulipes? were bred from the same bundle of cottony cocoons, and I have more than once observed the same fact. It may be inferred that the Pezomachus is the parasite of the Microgaster, yet it is possible their larvæ might inhabit the same caterpillar and the whole spin up together, for Ratzeburg has bred P. agilis from the larvæ or pupæ of Orthotænia Buoliana, P. hortensis from Tinea lichenella, and a third species, which he names P. terebrator, from the pupæ of Bombyx Salicis; whilst Schönherr has reared P. pedestris from larvæ of Hypera plantaginis, and Degeer has bred a species from the larva of a Curculio. Mr. Haliday bred a species of Pezomachus and Hemiteles fulvipes from the mass of cocoons formed by Microgaster intricatus.

"Scopula prunalis, *W. V.* End of April, the caterpillars feeding on the leaves of scarlet geraniums, at Cranford.

"Lophonotus fasciculellus, *Steph.* The caterpillars feeding on the leaves of Angelica sylvestris, leaving the entire membrane perfect like lace. Several specimens of this beautiful and curious Tinea were bred from them, together with a Microgaster.

"Tephritis guttularis, *Meig.* Bred from galls at the top or collar of roots of Achillea Millefolium.

"Heteroneura albimana, *Meig.* Bred from rotten willows. The pupæ resemble those of Piophila Casei.

"The following Staphylinidæ, which I have not seen in any other British collection, were captured by myself, and have not I believe been recorded as inhabitants of England:—

"Myrmedonia funesta, *Grav.*, I found in a fungus in Birch Wood, on the 6th of May, 1821.

"Gymnusa brevicollis, *Payk.* On the 13th of May, 1844, I swept a fine specimen off rushes by the side of a brook near the sea, at Covehithe, Suffolk; and Mr. Haliday also captured one on the edge of a pond near Holywood, Belfast.

"Euryporus picipes, *Payk.* I took this rare insect in June, 1837: I believe it was found under a stone at Slaughter, in Gloucestershire.

"Stenus vafellus? *Erich.*, and S. æmulus, *Erich.*, I discovered in the marshes at Horning, Norfolk, on the 14th of July, 1840. I am indebted to Mr. Waterhouse for the names of these two species, which he found in my collection."

British Species of Stenus.

Mr. Waterhouse read a memoir, by himself and Mr. Janson, on the British species of the genus Stenus, with notes on the species of the genus in the collection of the late Mr. J. F. Stephens.

Brazilian Ants.

Mr. Smith read a paper, by himself, entitled "Descriptions of some Species of Brazilian Ants, with Observations on their Economy by Mr. H. W. Bates."

In his note on a new species, Eciton legionis, *Smith*, Mr. Bates says that he only found it on open, sandy and grassy *campos*, which kind of locality afforded him an opportunity of observing some parts of the habits of the species, and the business which occupies its immense processions. Among other things, he noticed that the column consisted of two trains of ants, moving in opposite directions, one train empty-handed, the other loaded with a variety of the mangled remains of insects, chiefly the larvæ and pupæ of ants.

Mr. Brayley, present as a visitor, remarked that this fact might illustrate one of the causes of the accumulation of insect remains seen in strata of the secondary geological formation, for if these trains of ants had been covered up suddenly, the stratum in which they were imbedded would in after time exhibit the same appearance as the deposits to which he had alluded.

Mr. Saunders observed, that insects were sometimes congregated together in immense numbers by local or accidental circumstances: he remembered especially that, a few years since, Galeruca Tanaceti was seen in immense numbers on the Norfolk coast.

Errata.

Page 4568, line 12, *for* "cherry-tree drooping" *read* "drooping cherry-tree."
„ 4571, lines 27 and 30, *for* "murinus" *read* "castaneus."
„ „ line 28, *insert a comma after* "Kuper."—*J. W. D.*

Anniversary Meeting, January 22, 1855.—Edward Newman, Esq., President, in the chair.

30 MR 55

Election of Officers.

The Secretary read the chapter of the Bye-laws pertaining to the Anniversary Meeting, and the Report of the Library and Cabinet Committee made to and adopted by the Council. The Treasurer's accounts, duly audited, were laid before the Meeting, and it appeared that the finances of the Society were now in a better condition than

TO ENTOMOLOGISTS.

R. FOXCROFT begs to return his sincere thanks to the Trustees of the British Museum, the Nobility, Gentry and Clergymen, and also particularly he Members of the Entomological Society, for the patronage he has received for a nber of years; and he takes the liberty of informing them and others, that he intends king another journey into Scotland, for the purpose of collecting Insects, during the nmer of 1855: he purposes devoting seven months to collecting in England and tland, commencing early in March, and intends collecting through England on his to and from Scotland. Mr. Foxcroft, to enable him to carry out this plan, wishes aise a sufficient sum by Subscriptions of £1 3s. each Subscriber, who shall be entitled wo specimens of the order he particularly wishes to obtain: the whole of the Insects ected to be shared in November, on Mr. F.'s return: the boxes in which the Insects delivered to the Subscriber to be his property. Mr. F. hopes, by visiting different lities, to take many rare and new species, thus affording an excellent opportunity to tlemen of obtaining desirables to their collections. Subscribers are respectfully uested to send their Subscriptions in by the 1st of March; if by Post-Office Order to made payable at 210, Oxford Street, London. No person to be allowed to subscribe r the 1st of March, and no one to be considered a subscriber until he has paid his scription of £1 3s. Any person Subscribing £2 4s. will be entitled to specimens of the orders of Insects which may be captured. Subscribers of £1 3s. to receive two cimens of all the species captured of such order as he may subscribe for.

Note.—James Foxcroft has always a great variety of British Insects on Sale. All ls of Collecting and Store Boxes, Cabinets, &c., all kinds of Breeding Cages, Cabinets Shells, Fossils, &c., made to order on the lowest terms.

P.S.—Persons subscribing for Coleoptera will have no Lepidoptera; those who subbe for Lepidoptera will have no Coleoptera.

3, *Union Yard, Oxford Street, London.*

BIRDS' EGGS, AND BIRDS IN CASES.

R. J. C. STEVENS will Sell by Auction, at his Great Room, 38, King Street, Covent Garden, on Tuesday, February 27, at 12 for 1 o'clock, Collection of Eggs and Birds in Cases, amongst which are many Scarce cimens. Catalogues are preparing.

38, King Street, Covent Garden, February 1, 1855.

TO TOURISTS AND BOTANISTS.

HE FERN FLORA OF THE NORTH, comprising descriptions and localities of all the European, Azorean, Maderan, North American and tic Ferns, noticed by Koch, Fries, Webb and Berthelôt, Newman, Asa Gray and ebour. By Edward Newman, F.L.S., &c.

☞ A very compact pocket volume, nearly ready.

London: John Van Voorst, Paternoster Row.

TO ORNITHOLOGISTS AND PROFESSIONAL NATURALISTS.

is day is Published, in one Folio Sheet, an entirely New Edition of the

OOLOGIST LIST OF BIRDS observed in GREAT BRITAIN and IRELAND, to be used for Labels, and also to facilitate the Exchange of s and Eggs: it is brought up to the end of 1854, contains Latin as well as English nes, and is arranged in accordance with the Second Edition of Yarrell's 'British s.' Price 4d. *printed on one side only for Labels*, or 6d. *by Post*. Price 2d. printed oth sides, or 3d. by Post.

London: Edward Newman, Devonshire Street, Bishopsgate; and to be had of Van Voorst and all Booksellers.

TO BOTANISTS, FLORISTS AND SEEDSMEN.

This day is Published, in one Folio Sheet,

COMPLETE LIST OF BRITISH FERNS, printed on one side, and intended for Labels and also to facilitate the Exchange of Specimens. The ewhat conflicting Nomenclature of British Authors, from Sir J. E. Smith to the d Edition of Newman's 'History of British Ferns,' is harmonised and given in nological Order, so that every one can comprehend the whole at a glance. Price by Post 5d.

London: Edward Newman, Devonshire Street, Bishopsgate; and Sold by Mr. Van rst and all Booksellers.

CONTENTS.

On Artificial Sea Water, *Robert Warington, Esq.*, 4573.

Zoophytes.—Some Remarks on the Marine Fauna of the South of Devon, *William F Templer, Esq.*, 4575.

Insects.—On the Corporeal Sensations of Insects, *Octavius Pickard-Cambridge, Esq.* 4578.

Notices of New Books.—'The Zoology of the Voyage of H.M.S. Herald,' 4589 'Transactions of the Linnean Society,' 4590. 'The Annals and Magazine Natural History,' 4590. 'Transactions of the Entomological Society of London, 4592.

Birds.—Birds in the Neighbourhood of Blackheath in 1854, *Cuthbert Collingwoo Esq.*, 4592. Occurrence of the Snowy Owl in Sutherlandshire, *W. M. E. Milner, Esq., M.P.*, 4594. Singular Conduct in a Robin, *G. Norman, Esq.*, 4594.

Fishes.—Notice of a Tunny stranded in the Estuary of the Tees, *John Hogg, Esq.* 4596. Supposed New Species of Flounder, *Edmund Thomas Higgins, Esq.*, 4596 White Specimen of the Flounder, *Edward Newman*, 4596.

Mollusks.—Shell-fish burrowing into Rocks, &c., 4597.

Proceedings of Societies.—Entomological Society, 4599.

WHAT A USEFUL PRESENT FOR A YOUNG ENTOMOLOGIST!

Just Published, with a Coloured Plate, price Half-a-crown,

THE ENTOMOLOGIST'S ANNUAL FOR 1855; comprisin Notices of the New British Insects detected in 1854. Lepidoptera, by th Editor. Hymenoptera, by Frederick Smith. Coleoptera, by E. W. Janso

Edited by H. T. STAINTON.

OPINIONS OF ENTOMOLOGISTS.

"The 'Entomologist's Annual' cannot fail being very useful, both as an annu *resumé* of new discoveries, and as making Entomologists acquainted with each othe I wish it every success, and have ordered four copies to give to young Entomologica friends."—*William Spence*, 18, *Lower Seymour Street.*

"I think the 'Little Stranger' is the very thing we want, and you may depen upon my making such a welcome novelty known."—*T. J. Bold, Newcastle-upon-Tyne.*

"I have just received the 'Entomologist's Annual.' I am greatly pleased with i especially that portion of it which contains a list of the new insects discovered sin 1835."—*Rev. Joseph Greene, Dublin.*

"The 'Annual' is very much wanted, and should have the certain effect of stimulating to further observation and research. I hope it will meet such a body of reade as will induce its being continued."—*Hugh Colquhoun, M.D., Glasgow.*

"It is certainly a good design, and will tend to keep many a country collecto up to the mark who might otherwise have fallen in the rear; for it has hitherto been matter of no small difficulty to get information about novelties."—*J. W. Dunnin Cambridge.*

"I will do all I can to promote the sale of the 'Annual,' because I think i deserves support."—*G. R. Waterhouse, British Museum.*

"I think it an exceedingly successful and *useful* publication."—*T. V. Wollasto Brompton.*

"I have but little fear, after it is once known, of its having a large sale."—*Joh Scott, Stockton.*

"I am much pleased with the work: it is a book that was sadly wanted."—*R. H. Stretch, Banbury.*

"The 'Annual' is excellent, and will, I expect, set many a net which has lon laid dormant a-going again."—*George Wailes, Newcastle-upon-Tyne.*

"If the thousand collectors that I estimate there really exist in England are to b reached, it must be through such half-crown publications as yours."—*Edwin Le Worcester.*

London: John Van Voorst, 1, Paternoster Row.

EDWARD NEWMAN, PRINTER, 9, DEVONSHIRE STREET, BISHOPSGATE.